Collections Related to Synthetic Turf Fields with Crumb Rubber Infill

OMB Control No. 0923-New

New Information Collection Request

Supporting Statement Part B –

Collections of Information Employing Statistical Methods

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Part B. Collections of Information Employing Statistical Methods

B.1. Respondent Universe and Sampling Methods

As part of the *Federal Research Action Plan*, this is a new Information Collection Request (ICR) for two activities under the research protocol titled *Collections Related to Synthetic Turf Fields with Crumb Rubber Infill* (Attachment 7) sponsored by ATSDR and US EPA. Activity 1 (*Tire Crumb Rubber Collection and Characterization*) is aimed to obtain information about synthetic turf field facilities and operations, along with collection of recycled tire crumb rubber infill samples from both tire recycling/crumb rubber manufacturing plants and from synthetic turf fields with crumb rubber infill. Activity 2 (*Field User Exposure Characterization*) is a pilot-scale effort aimed at obtaining field user activity information and data, with a subset of respondents taking part in an exposure measurement sub-study and a videography component. Activities 2 and 3 are intended to provide information for characterizing exposures for synthetic turf field use scenario(s) that are likely associated with higher exposures.

Important study design constraints include the mandated timeline for research activity completion and reporting under the *Federal Research Action Plan*, and the resources available for implementing the research. By the end of 2016, the agencies anticipate releasing a draft status report that describes the preliminary findings and conclusions of the research through that point in time. Therefore, a convenience sample will be used for the research activities. Because the activities will not involve statistically-based sampling designs, the research will not provide data intended for nationwide generalizations. However, the research is anticipated to provide more information than is currently available, to fill key data gaps, and to improve exposure characterization capabilities needed to inform further evaluation. If successful, the study will also include more fields and field users than any previous single study in the US.

B.1.1 Activity 1 – Tire Crumb Rubber Collection and Characterization

The respondents of interest are tire recycling/crumb rubber manufacturing plants and facilities with synthetic turf fields using recycled tire crumb rubber as an infill material. Preliminary data gathering indicate there are approximately seven recycling/crumb rubber plants which supply 95% of the tire crumb rubber used in the U.S. Synthetic turf fields are used across the US with more than 12,000 fields currently in use (Synthetic Turf Council, 2015). Synthetic turf fields are primarily installed at municipal and county parks, schools, sports stadiums, and military installations. They are typically used for athletic, recreation, and physical education and

physical training activities, although some fields may see multi-purpose uses, such as concerts and ceremonies. While the research will attempt to recruit nine recycling plants and 40 facilities with synthetic turf fields in active use from a diverse array of facility types in the four census regions of the US, the facilities will not be selected as a representative sample of all US facilities.

B.1.2 Activity 2 – Field User Exposure Characterization

The respondents of interest are adults and youth that routinely use synthetic turf fields with crumb rubber infill for athletics, recreation, and/or physical education or physical training purposes. No data are available regarding the numbers of such individuals in the US, however, given the large number of installed fields it can be reasonably anticipated that the number of users is in the millions. As described in the *Federal Research Action Plan*, this research is a pilot-scale effort aimed at providing information and data for exposure characterization purposes. Respondents will be recruited from among those thought to be in one or more higher-exposure scenarios based on the frequency and duration of synthetic turf field use, as well as specific activities that may be involved in higher levels of contact with crumb rubber material. For example, sports with a higher frequency of contact with the ground could potentially lead to higher exposure (e.g. a football tailback would have more frequent contact with the ground than a baseball pitcher). Similarly, an individual with active sports use on the field would likely have a higher potential for exposure than an individual who walks laps around the field. We anticipate that the facilities used by the Activity 2 respondents will be a subset of the facilities participating in Activity 1.

B.2. Procedures for the Collection of Information

B.2.1 Activity 1 – Tire Crumb Rubber Collection and Characterization Research Aims

There are three primary aims of Activity 1. The first aim is to characterize a wide range of chemical, physical, and microbiological constituents and properties for tire crumb rubber infill material collected from tire recycling centers and synthetic turf fields around the US. While a number of research studies have examined crumb rubber constituents, most studies have been small, restricted to a few fields or material sources, and measured a limited number of constituents and contaminants. Also, few studies have attempted to assess potential differences in crumb rubber constituents and human exposure potential across multiple factors including location (e.g. material source and weathering), material age, and field type (e.g. outdoor vs. indoor). There are also gaps in our knowledge regarding microbial populations associated with crumb rubber on synthetic turf fields. This activity is intended to collect crumb rubber infill material from nine tire recycling/crumb rubber manufacturing plants and 40

facilities with synthetic turf fields around the US, with laboratory analysis for a wide range of metals, volatile organic compounds (VOCs), and semi-volatile organic compounds (SVOCs). Laboratory analyses will include bioaccessibility measurements for metals and SVOCs, and emission rate measurements for VOCs and SVOCs under different temperature conditions. In addition, non-targeted analysis methods will be applied for VOCs and SVOCs in an attempt to identify whether there may be potential chemicals of interest based on exposure potential and toxicity that have not been identified in previous research. To investigate the potential for exposure to chemicals attached to or released from dust particles, we propose analyses that include particle size characterization (% sand, silt, and clay), nano-particle size analysis, and metals analyses via X-ray fluorescence. A field-portable X-ray fluorescence device was selected for laboratory analyses due to the advantages that a single run detects multiple elements simultaneously and the analyses are non-destructive such that dust mass can be conserved and used for other analyses. The activity will also conduct microbial analyses on the crumb rubber samples from synthetic turf fields. A final piece of this research activity is to collate available extant toxicity data for chemical constituents and contaminants identified through laboratory analysis.

The second aim is to collect information from 40 facilities with synthetic turf fields to better understand how synthetic turf fields with tire crumb rubber infill are operated, maintained, and used with regard to characteristics potentially impacting human exposure to tire crumb rubber constituents Differences in source material, material age, indoor vs. outdoor installation, frequency of crumb addition/replacement, maintenance procedures (e.g. redistribution of crumb rubber material), synthetic turf field facility operations (e.g. ventilation for indoor facilities), and other factors may affect exposures. This study is intended to collect information from an array of facilities around the U.S. using questionnaires administered to field owners/managers.

The third aim is to identify and collate existing toxicity reference information for selected chemical constituents identified through the tire crumb rubber characterization measurements.

B.2.1.1 Activity 1 –Information Collection from Plants and Fields

Nine tire recycling plants that produce tire crumb rubber for use on synthetic turf fields will be identified and asked to allow for collection of tire crumb rubber material samples (Attachments 4c and 4d). Specific companies will be contacted to arrange sample collection using a telephone script (Attachment 4b). Tire crumb rubber from recycling plants will represent ‘new’ material that has not undergone weathering at synthetic fields for comparison with material from fields that has undergone weathering and active play. Three samples from different production batches and/or storage containers will be collected from each plant by research staff (Table

B.2.1). If possible, about half of the samples from recycling plants will be from the ambient production process and about half from the cryogenic production process. The actual numbers will depend on plant participation.

Table B.2.1. Number and Types of Tire Recycling/Crumb Rubber Manufacturing Plants

Tire Recycling/Crumb Rubber Manufacturing Plants	
Ambient Recycling Process	5
Cryogenic Recycling Process	4
Total Number of Plants	9 [a]

[a] Samples from three different batches or containers per plant are planned for collection, so the total number of samples is expected to be 3 x 9 = 27 samples. The proportion of facilities using different processes is a goal; actual proportion will depend on availability and participation.

In addition the owners/managers of forty facilities with synthetic turf fields with crumb rubber infill will be recruited across the four US census regions (Table B.2.2). The geographical diversity is likely to provide a range of material weathering conditions for outdoor fields and may include differences in crumb rubber source material.

Table B.2.2. Number and Types of Synthetic Turf Fields

US Census Region	Outdoor Fields	Indoor Fields	Total Number of Synthetic Turf Fields
Synthetic Turf Fields			
Northeast	5	5	10
South	5	5	10
Midwest	5	5	10
West	5	5	10
Total Number of Fields	20	20	40

Multiple outreach mechanisms will be used to identify and recruit facilities with synthetic turf fields. The US Army Medical Command may be able to facilitate access to fields at military installations and has expressed interest in a possible research collaboration. Federal contacts and outreach with state government organizations, including state and local departments of

health, may identify state and local fields, or serve as an intermediary for introduction to other state and local government organizations. Consideration will be given to including fields offered by local municipalities that are interested in participating. Professional and college athletic organizations may be contacted. Additionally, individual institutions or municipalities may be contacted directly in our recruitment efforts. Contacts will be made with field owners/managers to determine their level of interest, potential eligibility (Table B.2.2 field categories), and availability during the research implementation time frame for answering a questionnaire and providing or allowing collection of tire crumb rubber material samples. Up to 70 facilities with synthetic turf fields may be initially contacted for eligibility determination using a structured eligibility assessment screening script (Attachment 4f).

Field owners/managers agreeing to participate will be administered a questionnaire (Attachment 4h) by trained research staff in-person or over the phone using a Computer Assisted Interview (Epi Info™). Trained research study staff will collect most of the samples following specific protocols. Some organizations, specifically US Army Medical Command, may have staff members with skills and knowledge (e.g. industrial hygiene or environmental assessment) required to implement standard protocols and will be trained in research procedures. For most fields, samples from seven pre-defined on-field locations will be collected and composited in the laboratory (see the field sample collection form in Attachment 4i). Samples will be received at a central laboratory facility where composite samples and aliquots will be prepared and distributed to analysis laboratories. Samples for microbial analysis will be sent directly to the microbial analysis laboratory.

B.2.1.2 Activity 1 – Crumb Rubber Infill Chemical Constituent and Microbial Analysis

Crumb rubber material will be analyzed by laboratories for a wide range of volatile and semi-volatile organic (VOC and SVOC) and metals constituents and under a range of conditions related to assessing exposure potential. Crumb rubber will be digested and solvent extracted for direct analysis of metals and SVOC constituents. Samples will also be analyzed for bioaccessibility of select metals and SVOCs. In addition, samples will be placed in emission chambers under controlled conditions of ventilation, temperature, and humidity. Emission rate measurements will be made using two temperature conditions, including a temperature that may represent a warm indoor facility (25°C) and an upper temperature that approaches what has been reported for synthetic field surfaces under the hot ambient conditions (approximately 60°C). Emission rates will be measured for selected VOCs and SVOCs. Non-targeted chemical analysis techniques will also be applied to a subset of VOC and SVOC emission samples. Extant toxicological information will be compiled for crumb rubber chemical constituents of interest identified through laboratory analyses to inform hazard identification.

Tire crumb rubber samples will also be analyzed to assess the presence and densities of *Staphylococcus* species, and specifically, *S. aureus* using droplet digital PCR (ddPCR). In addition, the Panton-Valentine leucocidin cytotoxin virulence gene of *S. aureus* and antibiotic resistance genes will be quantified in samples. To investigate the presence of potential pathogens and relative contribution of human-associated microbes to the artificial turf field microbiome, non-targeted analysis of the bacteria in samples will be conducted using high throughput genomic sequencing.

Statistical power was considered in the stratified facility design (Table B.2.3). The statistical power for assessing differences in tire crumb rubber chemical constituents, emissions, and bioaccessibility is of interest to determine if there are likely to be meaningful differences in exposures based on tire crumb rubber age and weathering (unused recycling plant tire crumb rubber vs. synthetic field tire crumb rubber) and based on the synthetic field type (indoor vs. outdoor location). Although the potential difference in chemical concentrations between and among fields in different U.S. regions is of interest, this study is likely to be underpowered for assessing those differences. Measurement data for two chemicals of possible interest, lead and benzo(a)pyrene (BaP), were obtained from the literature. Using reported means and standard deviations, a range of powers for detecting significant differences in field type (indoor versus outdoor) means was calculated for sample sizes of 10 or 20 in each group (Table B.2.3).

These estimates suggest that for measurements of chemicals in tire crumb rubber materials with relatively low variability (low coefficients of variation or CV) differences in means below 20% for 20 in each group may be detected with reasonable statistical power (power ≥ 0.8). For chemicals with higher variability among fields, statistically significant differences may only be detected for differences in means above 100% when group sizes are 20. While larger samples sizes would be preferred, given the time constraints and limitation of resources --the proposed sample size in this study will most likely discern differences in chemicals with low variability among fields, as confirmed by one of the peer reviewers who commented on the research protocol. However, differences of a factor of two for chemicals like BaP between unused material and aged material, or between indoor and outdoor field material, may or may not prove to be wholly unlikely. For example, in one instance (Zhang et al. 2008), researchers observed a decrease in BaP from 8.6 ng/g in tire crumb rubber two months after installation to 0.8 ng/g nineteen months later in a single field.

Table B.2.3. Power of the T-Test to Detect Differences between Two Groups (α=0.05)

	N = 20/field group	
	Lead	BaP
	CV1 = 0.18	CV1 = 1.13
Difference	CV2 = 0.18	CV2 = 1.13
20%	0.925	0.085
50%	>0.99	0.278
100%	>0.99	0.782
200%	>0.99	>0.99

[a] Lead measured in tire crumb rubber from 5 fields, mean 26.6 ± 4.1 µg/g; Highsmith R., Thomas K.W., Williams R.W. (2009). A Scoping-Level Field Monitoring Study of Synthetic Turf and Playgrounds; EPA/600/R-09/135. National Exposure Research Laboratory, U.S. Environmental Protection Agency.

[b] Benzo(a)pyrene measured in uncoated tire crumb rubber from four fields, mean 4.1 ± 4.5 µg/g ; Menichini et al. (2011). Artificial-turf Playing Fields: Contents of Metals, PAHs, PCBs, PCDDs and PCDFs, Inhalation Exposure to PAHs and Related Preliminary Risk Assessment. Sci Total Environ. 409(23):4950-7.

Beyond statistical tests of differences of data between groups, the proposed data collection across a diverse range of facilities in the US will provide important information for characterizing exposures to crumb rubber constituents:

a) synthetic turf field installation and operation information and data,
b) the spectrum of user groups, activity types, use durations and frequencies,
c) the concentrations and bioavailability of selected crumb rubber chemical constituents,
d) emission rates of selected crumb rubber constituents under different conditions,
e) potential identification of crumb rubber constituents not previously measured or identified,
f) a listing of crumb rubber constituents found across all analyses, and,
g) toxicological information for identified crumb rubber constituents of interest.

The information and data will be made available for human exposure screening assessments and more detailed exposure modeling.

B.2.2. Activities 2 and 3 – Field User Exposure Characterization and Collection of Biological Specimens Research Aims

There are two primary aims of Activities 2 and 3. The first aim is to collect human activity data for synthetic turf field users that will reduce the reliance of default exposure factor assumptions in exposure and risk assessment. This activity is intended to collect information using

questionnaires from adults and youth who use synthetic turf fields with crumb rubber infill for several types of active uses including athletics and possibly physical education or physical training. Information will be collected to provide data about relevant parameters for characterizing and modeling exposures associated with the use of synthetic turf fields. In addition, extant videography of users engaged in activities on synthetic fields will be acquired to provide objective assessment of contact rates and types that are difficult to capture consistently using questionnaires.

The second aim is to conduct a pilot-scale exposure measurement sub-study for people using synthetic turf fields with tire crumb rubber infill, in what are likely to be among the higher exposure scenarios to improve understanding of potential exposures, particularly for the dermal and ingestion exposure pathways (Activity 2). The human exposure measurement data for synthetic turf field users are limited. Important data gaps exist, particularly for potential dermal and ingestion exposures to crumb rubber constituents. There are also important limitations in the types of methods that have been developed and used for human exposure measurements during activities on synthetic fields. There are challenges in collecting relevant surface, dust, and personal air samples. Few studies have performed measurements of dermal exposures. A limited number of studies have collected urine or blood samples that might be used for measuring biomarkers of exposures to chemicals in crumb rubber infill, which this study is designed to include as well (Activity 3). The study will be aimed at further developing and deploying appropriate sample collection methods and generating data for field use scenarios anticipated to be among those resulting in the highest potential for exposures.

B.2.2.1 Activity 2 – Field User Information Collection

Up to 75 people who engage in physical activities on synthetic turf fields with tire crumb rubber infill will be recruited across several use-type categories (Table B.2.4). The categories will include activity types anticipated to be among those resulting in higher exposure scenarios either because of the intensity and frequency of field use or because of potentially inherent differences in activity factors (e.g., soccer goalkeepers expected to have repeated contact with turf materials or children younger than age 12 that are likely to have higher hand-to-mouth contact rates). Examples of user types and categories and number of respondents of interest for data collection are shown in Table B.2.4. We anticipate up to 60 people will agree to participate in providing questionnaire responses.

Participants will be recruited from users of a subset of non-military facilities recruited for participation in the tire crumb rubber characterization activity described in Section B.2.1.1. Multiple outreach mechanisms will be used to identify and recruit field users. As part of the contact with field owners and managers (identified and contacted as part of the tire crumb

rubber characterization activity), the respondents will be asked whether they can assist in identifying potential participants of interest.

Table B.2.4. Number and Types of Synthetic Turf Field Users to Be Recruited for Questionnaire Data Collection

Example Activity Types[a]	Total Number Of Users Recruited	Total Number Of Users Participating[b]	Questionnaires		
			Indoor Field	Outdoor Field	Total Number Of Fields
Professional athletics (Group A)	15	12	6	6	2
College athletics (Group B)	15	12	6	6	2
High school P.E. or athletics (Group C)	15	12	6	6	2
Youth ages 10 – 12 athletics (Group D)	15	12	6	6	2
Children ages 7 – 9 athletics (Group E)	15	12	6	6	2
Total Number of Users	75	60	30	30	10

[a]These are examples of activity types of potential interest; the final categories will depend on recruitment success. Different activity types of interest for higher exposure scenarios may be identified through the field information gathering process.
[b]It is anticipated that up to 60 of the 75 people recruited will participate.

We anticipate recruiting respondents from only two different synthetic turf fields for each age group to minimize the time and cost given the study constraints. Field users will be contacted to determine eligibility (Attachment 5b) and request participation in the questionnaire and exposure measurement research activities (for a subset of questionnaire respondents, Table B.2.5). Based on *a priori* decisions regarding activities that may be among higher exposure scenarios, the recruitment may focus on specific types of users among a larger group. For example, more soccer goalies than field players may be recruited from a soccer team or league based on their likely higher contact rates with field materials. Adult and adolescent field users who agree to participate will be administered a questionnaire (Attachment 5d) by trained research staff in person or over the phone using a Computer Assisted Interview (Epi Info™). For children 7-9 (Group E) and youth 10-12 (Group D), we will administer the questionnaire to the parent/guardian (Attachment 5e). The questionnaires will be used to collect Information about

characteristics and activity parameters that may affect the magnitude of exposure to crumb rubber infill constituents, including:

a) demographic characteristics,
b) frequency of field use across a range of activity types,
c) duration of field use across a range of activity types,
d) levels of physical exertion that affect breathing rates,
e) contact rates for different types of activities,
f) different clothing types and uses, and,
g) hygiene practices.

Two types of videography data collection are proposed for this activity. Publicly available videography of physical activities for adult and youth sports participating on synthetic turf fields will be identified. A range of activities, including those in team practices and in games, may be considered for video information collection and analysis. Information about types and frequencies of various contact rates, along with clothing and protective equipment usage, will be collected. A subset of participants in the exposure measurement sub-study will also have videography performed for a specific sports or training activity on a synthetic turf field with tire crumb rubber. We anticipate enrolling 24 participants in the videography component of the activity (Table B.2.5). Enrollment in the videography component will be co-initiated with the exposure measurement sub-study until the minimum sample size has been reached (Attachment 5b). Once target sample size has been reached, the videography consent addendum will be removed from the consent form package. Video data collection will include simple counts of specific activity types, including but not limited to hand-to-mouth, diving on turf, falling on turf, laying on turf, sitting on turf, and hand contact with turf.

Questionnaire and videographic-based data will be organized into a database suitable for exposure characterization purposes, including exposure screening calculations and exposure modeling. Although a statistical design is not being implemented, differences among user groups will be explored to assess whether differences in activity types, durations, and frequencies occur that may affect exposure to crumb rubber constituents. No data sets have been identified that can be used to inform between-group difference power calculations for the exposure scenario parameters of interest (e.g. mean and standard deviation values for hours of field use per week, number of hand-to-field contacts per hour). There may be some autocorrelation in results because multiple people from a given field and/or team will be included.

B.2.2.2 Activities 2 and 3 – Field User Exposure Measurement Collection

Up to 45 people who engage in physical activities at facilities with synthetic turf fields with tire crumb rubber infill will be recruited across one to three use categories for participation in the exposure measurement portion of the research study (Table B.2.5). These participants will be a subset of those who respond to the questionnaire administration. The category or categories will include activity types expected to be among those resulting in higher exposures either because of the intensity and frequency of field use or because of differences in activity factors and likely contact rates. Examples of user types and categories and number of respondents of interest for data collection are shown in Table B.2.5. We will recruit field users in a given activity type category from only two different facilities (ideally, one indoor and one outdoor field, Table B.2.5) to minimize time and cost. Specifically, we will first recruit participants from Groups A, B, and E (Attachment 5b). If the participant sample size is not reached within those three groups, we will recruit in Groups C and D until the sample size requirement is met.

Table B.2.5. Number and Types of Synthetic Turf Field Users to Be Recruited for Exposure Measurements

Example Activity Types[a]	Exposure measurement Indoor Field[b]	Exposure measurement Outdoor Field[b]	Total Number of Users	Videography Indoor Field[c]	Videography Outdoor Field[c]	Total Number of Fields
Professional athletics (Group A)	8	7	15	4	4	2
College athletics (Group B)	8	7	15	4	4	2
Children 7 – 9 athletics (Group E)	8	7	15	4	4	2
Total Number of Users			45	12	12	6

[a]These are examples of activity types of potential interest; the final categories will depend on recruitment success. Different activity types of interest for higher exposure scenarios may be identified through the field information gathering process.

[b]It is assumed that all of the people recruited for questionnaire administration in selected activity categories will participate in the exposure measurement portion of the study. Up to two facilities for each type of activity; the facilities are likely to be different for each activity type.

[c]Videography will be done for a subset of participants who complete the questionnaire and participate in the exposure measurements (see recruitment description below).

Several types of personal and field samples will be collected (Table B.2.6). Specific sample collection and analysis methods have not been identified at this time. Some methods, including dust from synthetic turf fields, may require method development in advance of the conducting the exposure measurement sub-study. An exposure measurement sampling collection form is provided in Attachment 5f.

Table B.2.6. Number and Types of Samples for Exposure Characterization Measurements [a]

Sample Type	Number of Users	Number of Fields[c]	Number of Locations or Samples	Analytes[d]	Total Samples or Analyses
Personal Samples					
Air	45		1	VOCs	45
Dermal	45		4	SVOCs, metals	270
Urine	45		2	VOCs, PAHs, metals[e]	270
Blood	45		2	Metals[e]	90
Field Samples[b]					
Air		6	3[e]	VOCs, SVOCs, particulates	54
Surface wipe		6	3	SVOCs, metals	36
Surface drag sled		6	3	SVOCs	18
Dust		6	3	SVOCs, metals	54

[a]These are anticipated types and numbers of samples. Final decisions will be based on method availability, resources, respondent burden, and respondent safety considerations
[b]Samples of crumb rubber infill analyzed for constituents as part of Activity 1.
[c]Includes one indoor and one outdoor field for each activity type
[d]Each analyte type will require a separate sample
[e]Includes one-off field background location for each field.
[e]Actual analytical procedures to be determined.

Exposure measurement data will be organized into a database suitable for exposure characterization purposes, including exposure screening calculations and exposure modeling. Although a statistical design is not being implemented, differences among user groups will be explored to assess whether differences in activity and/or field types result in differences in exposure to crumb rubber constituents. Estimation of population distributions of exposures will not be possible using these data; however, if the scenarios do represent those leading to

higher exposures then the data will inform exposure assessment of what is likely to be in the upper end of the distribution.

Some environmental samples collected as part of the exposure characterization Activity 2 may not be analyzed within the time frame required for inclusion of results in the 2016 report due to the research time constraints. Additionally, the biological specimens will be archived and analyzed at a future date (Activity 3).

B.3. Methods to Maximize Response Rates and Deal with Nonresponse

Although this research does not rely on a statistically representative sample, a critical factor for the success of this study is identifying and recruiting a diverse range of field and field user respondents in a very short time frame. Immediately upon receiving approvals, we will contact numerous organizations and institutions to provide fact sheets and information about the purpose and value of the research and to request participation (Attachment 4a, 4e, and 5a). We will employ a number of strategies in an attempt to maximize response rates. These include having trained study representatives: 1) make multiple phone calls/visits at different times of day and on different days of the week; 2) leave detailed messages with a call-back number; and 3) calling "alternate contacts."

Currently, there is no information available to determine the potential bias at recruitment. We have included a question in the eligibility screening for those plant and facilities that decline to participate. The information collected will be descriptive in nature and will be reviewed for consistency across refusals.

B.4. Test of Procedures or Methods to be Undertaken

Few of the procedures and methods to be used in this study have been previously tested and evaluated. Exceptions may be air (metals and particulates), surface (metals), and material (metals) sample collection and analysis procedures used in the 2008-2009 US EPA Scoping Study (Highsmith et al., 2009).

Due to the very short timeline mandated for this research effort, any testing of survey instruments and measurement methods was limited. Any testing that occurred was among federal employees or among nine or fewer members of the public. ATSDR and US EPA completed testing and modifications prior to submitting the ICRs for PRA clearance.

B.5. Individuals Consulted on Statistical Aspects and Individuals Collecting and/or Analyzing Data

Table B.5.1. Personnel Consulted on Statistical Design

Name	Title	Affiliation	Phone	Email
Paul Jones, PhD	Biostatistician	US EPA	*(919) 541-4651*	*TireCrumbs@epa.gov*

Table B.5.2. Personnel Responsible for Collection and Analysis of Information

Name	Title	Affiliation	Phone	Email
Annette Guiseppi-Elie, PhD	Associate Director for Exposure Science	US EPA	*(919) 541-4651*	*TireCrumbs@epa.gov*
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Kent Thomas, BSPH	Research Physical Scientist	US EPA	*(919) 541-4651*	*TireCrumbs@epa.gov*
Contractors TBD				

References

Highsmith R., Thomas K.W., Williams R.W. (2009). A Scoping-Level Field Monitoring Study of Synthetic Turf and Playgrounds; EPA/600/R-09/135. National Exposure Research Laboratory, US Environmental Protection Agency. http://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=215113&simpleSearch=1&searchAll=EPA%2F600%2FR-09%2F135

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Zhang J, Han I, Zhang L, Crain W. Hazardous chemicals in synthetic turf materials and their bioaccessibility in digestive fluids. 2008. *J Expo Sci Environ Epidemiol*. 18: 600-7.

List of Attachments